

THE EFFECTS OF BIOMASS BURNING ON THE
CONCENTRATION OF TRACE GASES IN THE ATMOSPHERE

by

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Over the past several years, there has been considerable interest concerning the global effects of biomass burning on concentrations of trace gases in the atmosphere (reference 1-6). The paucity of reported studies and investigations into the effects of the "Greenhouse Gases" such as carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O), up until about a decade ago, would suggest that the topic was not then one of universal concern. Efforts are now being made to understand the biogenic, anthropogenic and photochemical sources of atmospheric trace gases.

Biomass burning which includes the burning of forests for clearing, the burning of vegetative stubble after harvesting, and lightning and human-induced wildfires (reference 6) is but one consideration under the general paradigm of atmospheric perturbations. A team of researchers from the Langley Research Center (I was included) along with the Canadian Forest Ministry, Ontario, Canada collaborated in an experiment in a deforestation effort through a prescribed burn.

Through a specially designed experimental modeling and instrumentation, we were able to collect a substantial pre-burn data set. The primary focus of the pre-burn experimental activities was the emission of nitrous oxide (N_2O) gas from selected sites. Rational: Nitrous oxide (N_2O) as identified as one of the "Greenhouse Gases" has, potentially, serious environmental implications. In addition to its ability, along with other gases, to significantly impact the climate of our planet, it diffuses into the stratosphere where it is chemically transformed into nitric oxide (reference 1).

Experimental Design: Specifically designed collars were put into selected sites within the proposed prescribed burn area. Several of the sites chosen were covered with live vegetation while other sites were more barren other than thick organic mulch from decaying vegetation. Sample of gases were carefully taken by syringe from each selected site pursuant to experimental methodology as outlined in reference 1.

It has been known for some time that nitric oxide (NO) and nitrous oxide (N_2O) are both produced by biogenic processes in the soil. It was the intent of this experiment to determine whether or not the production and emission of N_2O was enhanced due to the biomass burn.

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